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THE STATUS OF EDUCATION AND TRAINING OF RURAL YOUTH--THE IMPACT OF SOCIOECONOMIC CHANGE.

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RURAL SCHOOLS HAVE GREATER EDUCATIONAL RESPONSIBILITIES THAN URBAN SCHOOLS BECAUSE THEY MUST ATTEMPT TO PREPARE YOUTH EITHER FOR RURAL OCCUPATIONS, IF THEY REMAIN IN THE RURAL COMMUNITY, OR FOR URBAN OCCUPATIONS, IF THEY MIGRATE. IT WOULD APPEAR THAT RURAL SCHOOLS ARE FAILING TO DO THIS, AS EVIDENCED BY THEIR HIGH DROPOUT RATE, LACK OF GUIDANCE OPPORTUNITIES, AND INADEQUATE CURRICULUM. TO INCREASE THE EFFECTIVENESS OF THE SMALL SCHOOL AND TO IMPROVE THE EDUCATIONAL OPPORTUNITIES OF RURAL YOUTH, SCHOOL REDISTRICTING SHOULD BE ACCELERATED, NEW SCHOOL BUILDINGS CONSTRUCTED, RURAL TEACHERS AND ADMINISTRATORS BETTER PREPARED, AND MORE RESEARCH CONDUCTED. OTHER SUGGESTIONS INCLUDE--REVISION OF STATE AID FORMULAS, CREATION OF INTERMEDIATE SCHOOL DISTRICTS, EXPANSION OF VOCATIONAL EDUCATION, AND UTILIZATION OF LOCAL RESOURCES IN TEACHING METHODOLOGY. DUE TO THE EXPANSION OF KNOWLEDGE, YOUNG PEOPLE MUST BE TAUGHT TO GENERALIZE TODAY SO THAT IN THE FUTURE THEY MAY BE ABLE TO DISCOVER THE FACTS THEY WILL NEED TO KNOW TO SUCCEED. WE MUST REDEFINE OUR PRIORITIES AND DO A BETTER JOB WITH THE TECHNIQUES AND TOOLS THAT ARE ALREADY AVAILABLE. THIS SPEECH WAS PRESENTED AT THE NATIONAL OUTLOOK CONFERENCE ON RURAL YOUTH, OCTOBER 23-26, 1967, WASHINGTON, D. C., SPONSORED JOINTLY BY THE U. S. DEPARTMENTS OF AGRICULTURE, HEALTH, EDUCATION, AND WELFARE, INTERIOR, AND LABOR, OEO, AND THE PRESIDENT'S COUNCIL ON YOUTH OPPORTUNITY. (JS)

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THE STATUS OF EDUCATION AND TRAINING OF RURAL YOUTH: The Impact of Socioeconomic Change

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Rural education has as its setting the whole of American public education. The gross dimensions of the total educational effort of the American people are represented by the fact that in the fall of 1967 there are approximately 37 million youngsters enrolled in the elementary schools of the nation, there are 13.7 million enrolled in the high schools, and there are 6.5 million enrolled in higher education. This is a record breaking 57.2 million students entering the classrooms this fall, and they will be taught by approximately 2.6 million teachers. This brings the total school population, staff and students, to nearly 60 million people, or approximately 30 percent of the total population of this country.

This is an accomplishment unparalleled in all human history and among all the nations of the world today.

The goal of truly mass education did not enter the main stream of American life until after 1870. By 1910 the great majority of children from 6 to 13 were in elementary schools. By 1960 more than 99 percent of them were. In 1900 about 10 percent of children 14 to 17 were in high school, by 1930 more than 50 percent were, and by 1960 nearly 90 percent were. In 1910 only 5 percent of all youth of college age, 18 to 21, were attending college; by 1960 this figure had climbed to nearly 40 percent, and today it is somewhat over that figure.

This democratization of the opportunities to achieve an education by the rank and file of the common people is one of the great phenomena of American life and one of its major contributions to the development of civilization by all mankind over many centuries.

In more recent years the extension of educational opportunity to all the children of all the rural people has been something that has been little understood throughout this nation and the world, but the extension of educational opportunity, elementary, secondary,

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and higher, to rural children and youth is in part the explanation for the approaching of the 100 percent figure in the data noted above.

This isn't to say that all of the problems on rural school attendance, the extension of adequate educational opportunity to farm and village youngsters, has been achieved. They have not; and for more than fifty years any comparison of the educational opportunities and achievements between urban and rural young people shows that rural education lags measurably and conspicuously behind corresponding accomplishments in urban education. This is true whether one is considering the breadth and depth of the curricula, the percentage of students in average daily attendance, the qualifications of teachers, the availability of extracurricular activities for the enrichment of personality and the development of socialization, or the per capita costs of financing education, which in turn is a fair barometer of the values of education acquired.

Using certain census data from the 1960 census, Noble and Dawson, in 1961, reviewed some of the aspects of the educational status of rural youth. (13)* They pointed out that, as indicated above, the most rapidly growing school enrollments between 1950 and 1959 were among the school age population of rural areas. In fact, enrollment of residents of rural areas as a whole increased 26.3 percent faster than the enrollment of urban residents. During that time the rate of increase in the rural farm areas was 137 percent more than the urban areas. The rural nonfarm group had a rate of growth 61 percent faster than the urban group, and the rural farm growth exceeded the urban rate by 32 percent. By 1959-60 the percent of the school age population in rural communities enrolled in school was 95.4 percent of the age group, comparing very favorably with the urban population of 98.6 percent enrolled in school.

In 1959 in the rural farm areas 4.3 percent of the population 14 years old and over were illiterate as compared to 1.7 percent in urban areas and 2.2 percent in rural nonfarm areas. The median years of schooling completed by persons 25 years of age and over increased from 9.3 years in 1950 to 11 years in 1959. In 1959 the median years of schooling completed by urban persons 25 years and older was 11.4 years, rural nonfarm was 11.1 years, and rural farm 8.7 years. It is obvious that the difference between the level of educational attainment of rural and urban areas was different in 1959 but the difference had been increased during the previous decade.

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*Numbers in parentheses refer to the numbered bibliographic references at the end of this paper.

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The rural farm areas of the United States have traditionally had a disproportionate share of the least educated persons 25 years old and over.

The rural areas of the nation have also had a disproportionate share of the teachers whose educational qualifications were below standard. Of all the teachers in the public schools in the United States in the late 50's there were 53.2 percent of them holding bachelor's degrees, and 24.6 percent master's degrees or higher. However, for rural teachers the figure was 49.3 percent holding bachelor's degrees and only 11.5 percent holding master's degrees. Among urban teachers 55.8 percent held bachelor's degrees and 33.3 percent held master's degrees. In other words, much of the task of upgrading the level of teacher qualifications in the United States is a rural problem.

By comparison with national averages and by comparison with urban teachers, rural teachers traditionally have remained for shorter periods of time in the same school system, have had lower levels of preparation, and have also had a lower average annual salary. This is true whether one is comparing rural and urban twelve-grade school systems and one-room school systems or whether one is looking at the 1,199 most rural counties in the United States in comparing these figures with the national average.

More specifically the educational opportunities for rural youth are exemplified by an analysis of the educational opportunities which are available in the typically smaller rural high schools. In 1956 among the 1,760 most rural counties of the country, the average rural elementary school had 107 pupils and 3.7 teachers as compared to 354 pupils and 11 teachers in the cities from 2,500 to 10,000. For these same counties the average high school had 177 pupils and 8.7 teachers compared to 436 pupils and 20 teachers in those same small cities. It is estimated that of somewhat over 20,000 public high schools in the United States at least 16,000 are too small to have a minimum of 100 pupils in the graduating class, a figure that Conant said was an acceptable minimum size in his review of the American high school several years ago. Obviously, small high schools and small staffs cannot provide for the depth and breadth of curriculum for adequate educational opportunities for rural young people.

At this point it might be well to indicate that the rural high school has an even greater responsibility than the urban high school. We are familiar with the urbanward migration that has characterized this country for many many decades. The graduates of the rural high schools, in other words, must be prepared for those occupations that are largely rural oriented if they remain, or they must be

prepared for those occupations in our towns and cities if they migrate. In other words, the rural high school has as great a responsibility in the depth and breadth of its curriculum as a city high school has but in addition must have the type of program that is appropriate for those graduates who will remain in the rural environment and take up occupations in agriculture and the extractive industries and the processing of those products as well as working in those service occupations that cater to such workers.

Of course, much of this situation in small schools is caused by the fact of the existence of very large numbers of small districts. There has, of course, been tremendous progress in the elimination of very small schools and districts and in the elimination of large numbers of districts in the last 20 to 30 years. As a whole, the continental Unived States has made considerable progress in the last 30 years in reducing the number of local school districts. To the nearest thousand the number of districts in 1932 was 128,000. In 1948 it was 106,000; in 1953 it was 67,000; in 1961 it was 36,000 and in the fall of 1966 it was somewhat less than 22,000. (7 and 4)

In general it can be said that larger districts provide larger schools, and given small schools with their shortcomings in qualifications of teachers, limitations of program, and excessive costs, shortages of educational opportunities are almost inevitable. It is a fact that the problems of small schools are almost exclusively confined to rural and rural-related schools.

It is a well known fact that not more than one farm boy in ten can hope to make an adequate living in farming. There will be many of this group of any given ten who, of course, will go into nonfarm but still rural areas and enter occupations characteristic of those areas. However, many of them must still migrate to the cities, and they must be prepared for better opportunity there than apparently they are able to secure, if one recalls the happenings in the internal sections of certain cities last summer.

It should also be noted that much of the rural high school curriculum is geared first toward the academic preparation for entering college and only secondarily toward the preparation for an occupation or for the subsequent vocational training that might lead to successful entrance into an occupation. The result is an extremely high dropout rate among rural youth. Ducoff, Beale, and Nam (6) made a study of this situation as the result of 1960 census data and indicated that the growth in the size of the school age population by 1970 would result in 56.4 million persons 14 to 24 years of age in the United

States. But if the dropout rate for the 14 to 24 year olds remained at the 1960 level, there would be 12.9 million of these persons failing to complete high school. If the 14 to 24 year old dropout rate declines as much between 1960 and 1970 as between 1950 and 1960 (29 percent) then the number of actual dropouts would be about 9 million. Rural America will have more than its share of this group. It is a well known fact that the total number of young adults in the nation is growing rapidly. (Indeed one of my colleagues some time ago facetiously remarked that one-half of all the hair grown in this country today is grown by people under 26 years of age, and another one remarked as a corollary that the only thing wrong with the modern teenage population was that we are not one of them.) If the number of dropouts is not to increase over the 1960 level, the dropout rate would have to be reduced to 10.8 percent, which is a reduction of more than 50 percent.

There have been calculations made as to the cost of keeping the dropouts in schools, and the total national figure is one that is almost fantastic. However, the other side of the coin must also be viewed. The cost of providing additional schooling may be more than offset by the benefits of education to the individual and to society in the form of higher incomes, increased knowledge and skill of the labor force, greater productivity, and the reductions in the rates of unemployment and dependency, to say nothing about the values accruing to the nation as a whole in the form of better citizenship on the part of this large segment of young people. In other words, even though the cost of providing physical plants; adequate facilities; trained, competent and sympathetic staff; efficient administration; and an educational program realistic to their needs is high, the cost of not providing these facilities for so large a segment of our population--the cost of failing to provide them--may be much greater.

In smaller community schools there is also the need to improve greatly the guidance opportunities for these young people, something that has long been a difficult problem. Most rural high schools are too small to employ a full time guidance director, and the best way to provide such service is through a combination of local districts into an intermediate unit--a county or a union of several counties. As indicated above, the majority of rural youth must by preference or necessity move to urban areas in pursuit of adult careers. Wide disparity frequently exists between occupational preferences or aspiration levels and available occupational opportunities for these young people. They are so frequently at a disadvantage when entering the urban labor market and competing with urban youth for available occupations, and rural farm youth are at a greater disadvantage than rural nonfarm youth upon entering the urban labor market. Their

decision-making is further complicated by the lower economic status of their families because this greatly lessens the alternatives available to them. (1)

More detail than is possible here on the educational accomplishments of rural children, youth, and adults, can be acquired from various publications of the U. S. Department of Agriculture and the Rural Department of the National Education Association. One could devote the whole time allotted to this report in itemizing significant census data alone, but this would probably not be very attractive listening.

The second part of this discussion which I should like to set forth is concerned with programs of action, with what should be done to improve the educational opportunities of rural youth. Many of these are so well known and have been so well accepted by the teaching profession, by local school boards, and by many lay educational leaders for so many years that they are almost taken for granted. However, it seems advisable to set them down in very concise form in order that we shall place upon them greater importance than is generally accorded them. (5)

The first and most significant job that needs to be done is to continue to accelerate the local school district reorganization movement. As indicated above, the progress has been remarkable in the last twenty to thirty years. However, progress is so frequently measured in terms of the number of districts eliminated instead of the number of adequate districts produced, that the problem of school district reorganization is far from solved, if indeed we can even see the ultimate end of the movement. (4) In general, adequate districts are those that have 40 teachers or more, and they are a pitifully small percentage of all of the numbers of present districts in the country. It is estimated that approximately ten to twelve thousand districts are all that will be needed at the local level.

The second suggestion for improvement in the field of enhancing the opportunities for rural youth is to make funds available for the construction of new school buildings which will, of course, be necessitated by the reorganization of districts and the enlargement of attendance units within them. Much of the financing of new school buildings during recent years has come about through the expansion of the bonding territory, but here too, the bonding territory being largely farm land is reaching its limit of capability because of relative decline in farm income and hence the necessity to look for other sources of revenue to rebuild the schools of rural

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areas. The only two other sources are, of course, State and Federal.

The third most significant area of need is better preparation of a sufficient number of rural teachers and administrators. It is a fact long well known and unfortunately accepted that rural school personnel by comparison with corresponding urban personnel, have been badly under-prepared.

The fourth thing that needs to be done is to recognize the fact that even with adequate local school district reorganization there will still be a very large number of small high schools, and ways must be found to make them more effective. Much research and experimentation in the improvement of these small high schools is now going on. Your attention only needs to be called to the Rocky Mountain School Area Project, the Catskill Area Project, the Texas Small School Improvement Program, and the Upper Midwest Small Schools Project to document the fact that it is possible to have reasonably adequate educational programs, although somewhat costly to be sure, in small high schools if present knowledge as to what makes a good small secondary school can be put into practice.

There are few things inherent in small schools that make them necessarily bad; it is simply that they just usually are, and they don't need to be.

The fifth item would be that more equitable funds for current expenses must be forthcoming for rural schools and those small city schools attended so largely by many rural young people. Despite the professing of the equalization principle on the part of educators and legislators, there are too many State aid formulas which still do not sufficiently compensate for the two most significant excess cost parts of rural school district budgets; namely, sparsity and poverty. For rural schools, both of these depressing factors are outside the control of the local school board, and State aid formulas must be adjusted in such a way as to compensate more definitely for sparsity with State paid transportation and for poverty with State equalization funds for operation and capital outlay.

The sixth procedure that will improve the educational opportunities for rural young people, and might even be listed as a higher priority item than number six, is a vast expansion of intermediate administrative units with sufficient personnel and financial resources to provide those kinds of services for which the local district, even when adequately reorganized, is still too small and for which the State is usually too remote. In many instances, this means an intermediate district made up of more than one county. The movement in Iowa, for example, to join counties together under a single or

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joint board and one intermediate district superintendent has given the country some experience in the values derived from larger intermediate school districts.

A study made in North Dakota some years ago indicated that, if one utilized socioeconomic criteria for the determination of intermediate school district centers and boundaries, the State could well be divided into eight intermediate school districts which would be both service centers for the component districts within them and arms of the State Department of Public Instruction instead of the present 53 counties in that State. Other States making notable contributions to the knowledge and expertise in this administrative structure would include Michigan, Pennsylvania, Wisconsin, and California. We have not yet explored in a great detail the tremendous possibilities for improving educational services for rural young people through better organized, financed and managed intermediate school districts.

The seventh suggestion for improving the educational opportunities of rural young people is an expansion of vocational education in trades and industries, business and commercial education, distributive occupations, industrial arts, home economics, and agriculture. As indicated above, most rural high school curricula provide first for the academic program and only secondarily for the vocational program. This is in no small measure an explanation for the very large number of dropouts from our small community high schools.

Eighth and finally, special curriculum adjustments and instructional procedures must utilize the total environmental resources in teaching methodology in elementary and secondary schools. It makes no difference whether the school is still a left over one-room country school or whether it is a village, town, or consolidated twelve-grade district of a few hundred or even a thousand pupils--all of these young people still live in the rural environment.

The development of a curriculum that utilizes local community resources in a teaching program, that compensates for local educational and cultural shortcomings, that has as its major orientation the improvement of the quality of living now and here rather than the teaching of subject matter, that presumably will have some useful application in the decade ahead, should characterize the teaching methodology in all twelve-grade community schools.

There are probably other methods of generally known and generally accepted improvement of educational opportunity for youth in smaller communities, but this is sufficient to indicate the directions toward which we should devote our energies in the years immediately ahead.

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This goal of developing community oriented schools is no better expressed than in the following paragraph taken from the report of a national commission:

> The subject of paramount importance in our correspondence and in the hearings is education. In every part of the United States there seems to be one mind on the part of those capable of judging on the necessity of redirecting rural schools.... Everywhere there is a demand that education have relation to living, that the school should express the daily life, and that in the rural districts they should educate by means of agriculture and country life subjects.

Does this sound like a national committee report from some farm organization in 1967 or the summary of a study made by the National Education Association or some State commission? It could well be such a statement. However, I must remind you that it is taken from the report of the American Country Life Commission published first in September 1910, fifty-seven years ago. (2)

There have been many State and regional study commissions which have looked at these problems and proposed solutions. One of the more interesting studies supplementing the foregoing analysis was made by the Southern States Work Conference several years ago. (14)
In reviewing the implications for the curriculum as they saw it in the southeastern States, this committee concluded that more experience for the development of communication skills and social competency should be provided, that more consideration should be given to the peculiar health needs of rural people, that present physical education programs should be broadened, that greater attention should be given to understanding the value systems of our free institutions and those ideals still persisting in rural society which typify the American system of freedom and democracy, that more attention should be given to the changing nature of our rural economy, that conservation and wise use of resources should be more strongly emphasized, that more attention should be given to teaching the wise use of leisure time, and that to implement these developments and improvements we need more informed lay participation in curriculum planning and the utilization in the school curriculum of other agencies outside the school which can make a contribution to the enrichment of the curriculum.

Let us turn now to the third consideration of this paper: namely, the nature of socioeconomic changes taking place in the United States and the implications for rural education that these changes may have. Some of these are of such common knowledge that they almost do not need repeating, but the American people must more definitely appreciate their significance and magnitude. We know

that in the scientific field changes are taking place so rapidly that we must learn a new body of knowledge about every ten years. In fact, one speaker recently stated that if you were yourself not reading five hours a week you are gradually becoming obsolete as a person. We know that these changes have come to all fields of our world of knowledge, that they have engulfed farm and rural communities alike; cities and suburbs have been in part their leaders, and we still somehow fail to appreciate their magnitude. (15) We know that mechanization and the new farm technology have replaced not only man-power and animal power on the farm but have reduced the number of farm workers needed in farming and have even made obsolete much of the machinery itself that was used as recently as ten years ago. We have heard repeatedly that now it only takes about four farmers out of a hundred to feed and clothe the other 96. We have heard it often stated that today only one farm boy in ten can expect to earn a good income from farming. (12)

Common observation also shows us that we are as a people participating in enlarged socioeconomic units not only in our cities but on our farms and in our villages and towns. We observe food supermarkets in larger towns that have displaced the small grocery stores in the villages several miles away. We have observed department stores, apparel stores utilizing customer self-service and having such a wide variety of products in the larger towns and smaller cities that farmers and even small-town people go for many miles to take advantage of the mass production and mass distribution to get more of these goods at lower prices. We know that the development of the faster automobile and paved roads have been major factors in these developments. However, rural people could not have taken advantage of these without higher real incomes and their stimulation of a demand for a greater variety and breadth of consumer goods and services, recreational activities, public school curricula, medical services and all of the other advantages that accrue only from larger units of operation. (8)

Two years ago a group of governors and other State officials in eight of the Rocky Mountain States held a series of conferences whose purposes were to analyze socioeconomic change and determine what these changes meant for education. (11) They summarized the prospective changes in society, and then suggested and planned some of the needed changes in education necessary to make adaptation to such change and even, hopefully, to direct it. Under the direction of Dr. Edgar L. Morphet, project director, the successive conferences pointed out that some of the major trends identified centered around automation; urbanization and its concomitance; communication; breakthroughs in biology; and breakdowns in religious, ethical, and moral concepts.

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Other changes--significant societal changes--included the struggle for human equality, the war on poverty, the changing balance in work and leisure time, and the many faces of rebellion and protest.

Another set of realities of the current scene primarily concerned with international affairs included the threat of nuclear warfare, the emergence of many new nations, the determination of the colored races to achieve their legitimate position, the population explosion and the concomitant crisis in food production, the ever-increasing and more visible disparity between the haves and the have-nots, the ideological struggle between democratic and communistic systems, the emergence of person-to-person forms of international relations such as the Peace Corps, and the rise of programs for international cooperation such as the common market. (11)

All of these changes are the explanation for the many problems and issues in the world, and they suggest that the world is changing at an ever-accelerating rate with the probability of new developments in the future which are as yet unforeseen. All of us agree on the fact of change, but as was indicated earlier, we do not appreciate sufficiently the magnitude, the significance and the implications of this revolution.

This implies that our schools must do a great deal more to teach our young people not the facts of life as we know them today but to teach them to discover the facts of life that they will need to know for tomorrow. Our schools should be more concerned with developing each citizen's effectiveness to grow in his ability to solve problems and to continue learning throughout his life rather than basing his education on the knowledge acquired in formal schooling with the acquisition of facts which will be mostly obsolete in a decade. Indeed, it was pointed out at the Denver conference that "a person with genuine flexibility and freedom, a person who thrives on sensing and solving problems as complex and as subtle and as new as a technological environment of tomorrow, is the kind of person we need to develop. In this new world rigidity may actually be a greater barrier to progress than ignorance." (11)

There are other evidences of dimensions of change which we have not sufficiently appreciated either.

Several years ago the Iowa State University Press under the editorship of James H. Copp documented with a number of sociologists and rural economists the changing nature of rural society, its perspectives, and its trends. (3) In the chapter devoted to "The American Society in Transition" Williams has noted some of these changes. Permit me to call your attention to only the more significant of these.

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Williams has stated here that the United States has become an urban society with two-thirds of the population living essentially in an urban setting; in fact, three of these--the areas around New York, Chicago, and Los Angeles--include more people than there are in all of the true rural farm areas of the country combined. Most of us remember the beginning of television. By 1959 television sets were in 86 percent of the nation's homes, and each set was turned on about five hours a day. Just imagine the tremendous influence for the unification culturally, educationally, and politically, of our farms and village people and our urban people through the mechanism of this one common medium alone. The coming of health services to the countryside, still to be sure having many shortcomings, is evidenced by the fact nationwide that from 1930 to 1956 the combined death rate per 100,000 population from diphtheria, whooping cough, typhoid fever, and smallpox dropped from 250 to 25; in other words, only one-tenth as many people died from these combined diseases per 100,000 population in 1956 as did in 1930. We have all of us bought automobiles over the years, hardly realizing that from 1930 to 1956 the motor vehicle registration in this country increased from 26,000,000 to 67,000,000. Williams also summarized some of the interesting developments with regard to changes in kinship and family groupings, neighborhood and community organization, increasing social stratification and even some of the significant changes in education. We shall not document these here except to emphasize the fact that there seems to be a long-term movement toward the dominance of large scale formal organizations and huge corporate structures, probably the most important single trend of the 20th Century.

During the past fifteen years my hobby of private flying and the direction of many aerospace education workshops at the University of North Dakota have placed me in touch with some of the developments in one of the most significant sectors of socioeconomic change. For instance, the aerospace people now tell us that they have a radar that is capable of detecting a square meter object--a little more than a yard square--at a distance of some 3,000 miles. Now this is equivalent to getting a signal reflected off a 30 caliber bullet at 200 miles away, and that, in any language, is a very fine capability. We have the capacity to detect ballistic missiles that may come over the North Pole and transmit their detection to the Strategic Air Command at Omaha, the North American Defense Command in Colorado Springs, and the Joint Chief of Staff in Washington, D. C.--all in less than one second. If you have followed the development of space technology in recent years, you will note that there are now so many orbiting satellites that they have to be accounted for by the Air Force at the rate of one every twelve seconds. We have developed a visual tracking system that is able to detect a bowling pin three thousand miles away.

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One of the lecturers at these aerospace education workshops, Mr. Harold Pluimer, told our class recently that one year today produces a million times the knowledge developed in a year in Benjamin Franklin's time. We have had scientists also tell us that knowledge doubles every fifteen years and has a ten-fold increase every fifty years.

If we were to make an arithmetic projection on a chart describing this accumulation of knowledge from 1750 to 1850, it would take only a three-inch curve; but if we were to continue to 1950, it would require a curve twelve miles high. In the next fifteen years, Pluimer said, we will learn more knowledge than has been learned since the time of Christ.

We have tremendous production in agriculture, and this is one of the reasons why so much of our rural educational structure, methods of financing, and curriculum are totally obsolete. It is a well known fact that fifty percent of today's farmers produce only ten percent of our food, and the other fifty percent of our farmers produce the other ninety percent. Indeed, if it were not for the human factors involved, we could probably eliminate fifty percent of the farmers of this country and still have to spend eight billion dollars a year just to store the surplus. This tremendous improvement in the productive capability of the individual man using modern technology, mechanisms of all kinds, and unbelievably great power has been universally little understood. It is a fact that ninety percent of the light bulbs in this country are made today by machines and computers employing just fourteen men.

You may recall the voyages of White and McDivitt as one of the first Gemini space flight crews; but do you realize that they backtracked Columbus' voyage in just fourteen minutes? Commander White walked farther in space in twenty minutes than Lindberg flew in thirty-three hours when I was a sophomore in college. It is significant that probably someone in our time will be the first to walk on another world.

I have mentioned transportation by aircraft. Every day there are a thousand jets landing and taking off at Chicago's O'Hare International Airport and 150,000 people are on board; yet eighthy percent of the people of this country have never been in an airplane and forty percent of the people in this country have never been more than 200 miles from home. How can you expect to keep the unification of citizenship in this country, necessary to solve its political problems, when some people have such a broad knowledge of the earth through travel, communication and education, and others have an environment so limited that they are almost as obsolete as persons as the Model T automobile.

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There are today computers that are capable of multiplying man's intellect many millions fold. About thirteen years ago there were in this country just six computers. Today there are over 30,000 computers. One of these in one second can make more calculations than twelve mathematicians could make with twelve computers a dozen years ago. If we had to handle all the telephone calls made today through the use of the old type switchboard and the central operator with her pleasant voice, it would require every female in this country between the ages of 17 and 70. The pace of socioeconomic changes in this country has been so huge as almost to defy our imaginations. As a people we look at them day after day and still say, "We just don't believe it!"

But if we have seen, even though unappreciative of them, the vast social, economic, and political changes of the immediate past and of the present day, what of tomorrow? A year ago the Honorable Hubert H. Humphrey, Vice President of the United States, delivered the commencement address at the Duluth Branch of the University of Minnesota. (10) In this, the Vice President indulged in this frightening pastime of looking into tomorrow and reported the results of the thinking of a Commission which had dreamed to the year 2000 to anticipate social problems and to design new institutions to cope with them. This blue-ribbon Commission of a half a dozen non-governmental organizations selected by the American Academy of Arts and Sciences included engineers, physical scientists, mathematicians, economists and social scientists. The Vice President reported this Commission foresaw the following developments within the next twenty years: In agriculture: the large scale use of desalinated sea water, making many of today's deserts blossom. In medicine: the routine transplantation of natural organs from one person to another and the use of artificial ones. In psychiatry: the widespread application of drugs that control or modify the personality. In education: the use of more sophisticated teaching machines and really radical teaching techniques. In worldwide communication: the everyday employment of language translating machines. In industry: the extensive use of automation up to and including some kinds of decision-making at the management level. And in space: the establishment of a permanent manned base upon the Moon. These were what the panel of scientists saw in 20 years, but for the year 2000 these experts saw such far-out developments as the virtual elimination of bacterial and viral diseases; the correction of hereditary defects through the modification of genetic chemistry; the stepping up of our food supply through large scale ocean farming and the fabrication of synthetic proteins; control of the weather at least on the regional scale; in space, the landing of men on Mars and the establishment of a permanent unmanned research station on that planet. And finally, the creation in the laboratory of primitive forms of artificial life.

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If rural education is to make its contribution to the achievements of the brave new world thus envisioned, what must be done and who must do it?

The first thing that must be done, it seems to me, is to do those so obvious things that we have been doing only half-heartedly and sporadically. These were mentioned earlier. We know we are not organizing school districts as rapidly and as effectively as we know how. We are not developing curricula adequate to the needs of this and the coming years as effectively as we know how. We are not financing education with a defensible, objective distribution of the burden between local, State and federal sources of revenue as effectively as we know how. We are not training teachers to teach the kinds of schools we need as effectively as we know how. The first thing, then, is to use the techniques and the tools that are already available to us to do better the jobs that we are now doing only half-heartedly. Today education has to be everybody's business. (9) We have for several years had federal financing and local cooperative development of what has been known as the "urban renewal" programs. Why can't we develop a "rural renewal" program as a means of stemming the urbanward migration by making our rural communities better places in which to work and live?

Secondly, we seem somehow to have our priorities mixed. We, as a nation, devote altogether too many of our resources to things of material nature instead of to things of educational and spiritual nature. Our young people seem to have lost something of the values that have made this nation great, and the loss of those values in the future will prevent the solution of the problems which the times are thrusting upon us.

Surely the lessons of history are as valuable today as they were in the days of the founding of this nation. The Ten Commandments, the Sermon on the Mount, the Golden Rule, are just as true today as effective rules of right living and the governing of conduct among men as they have ever been throughout all history. The values which have made this nation great, if retained and followed, will remain to keep it so. These are our Judeo-Christian religion which gave us our purpose in life, the Constitution which gave us our Bill of Rights, our free economic enterprise system which gave us our standard of living--the highest in the world--and our system of free, nonpartisan, nonsectarian, classless, democratic education which gave every citizen the opportunity to develop his talents to the maximum of his ability and industry. All four of these values are so interdependent that if one were removed, the whole of our value system would collapse--and with it, the nation.

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What is needed today more than anything else is a bigger man in a constantly shrinking world. Leadership on the part of all of us in our own theatre of operations, whatever it may be--on the farm, in the home, in industry, in government, in business, in commerce, and in international affairs--is the crying need of the hour. What is needed in this country about as much as anything else is a re-dedication to the preservation of the values which have made this nation great. The times call for leadership of the highest order. Never in the history of mankind have the dangers for ending life as we know it been so great; never in the history of mankind have the difficulties been so enormous as almost to make us believe that human beings can no longer cope with the complex problems that control their destinies; but never in the history of mankind, also, has the promise of the future been so brilliant.

Our opportunities remind us of Alfred Lord Tennyson's poem "Ulysses" who had travelled for two decades around the Mediterranean Sea in those ancient times attempting to come home to his wife, Penelope, and his son, Telemachus. As he reviewed his travels when he finally arrived home, he said, "I am a part of all that I have met. Yet all experience is but an arch through which gleams that untravelled world whose margin fades forever and forever."

Let us see our duty as clearly through the arches of the next century.

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